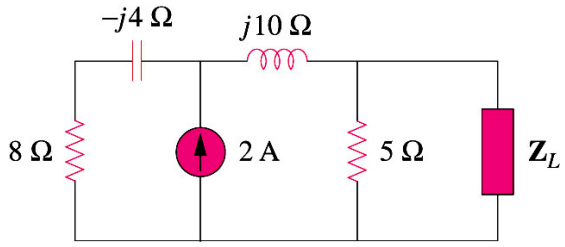
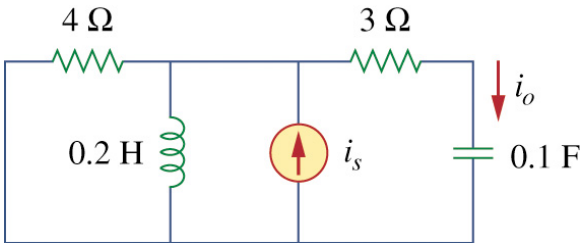
Content from this homework may appear on the second exam, scheduled for November 13, 2019. We will review this homework in class on Monday November 11, so make sure you do it before then. Use this as your opportunity to study this new material.

1:
If the load resistance is 4Ω, and the load reactance is $-j2\Omega$, find the node voltages. Use the complex form of Ohm's Law, $\mathbf{V} = \mathbf{IZ}$, where $\mathbf{V}$, $\mathbf{Z}$ and $\mathbf{I}$ are complex values. Nodal analysis and mesh analysis work just fine, but are done with complex arithmetic! Because the complex impedances are given, you may assume that the source is $2\angle 0^\circ \text{ A} = 2\cos(\omega t)$ A.



2: Repeat problem 4 by treating $\mathbf{Z}_L$ as the load and using Thevenin's Theorem. You will find the Thevenin impedance and the (sinusoidal) Thevenin voltage. *Hint: Do not panic! Just do what you would do with resistors using the complex impedance of the elements.*

3: If $i_S(t) = 5\cos(2\pi ft)$ and $f = 5\text{Hz}$, write the phasor and rectangular forms for $i_0(t)$.



4: If $v_S(t) = -3\sin(100t + 45^\circ)$, find the value of $i_X(t)$ in phasor, rectangular, and time domain forms. *Hint: Convert the sine to an equivalent cosine with a positive amplitude and work from there.*